# Assessing Fair Policing in Austin, TX

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4/18/2021

# Introduction

This paper investigates racial disparities in traffic stops by the Austin Police Department. Using data available from Austin Open Data, a Texas government-run data portal, and from the Stanford Open Policing Project, we evaluate these disparities using models derived from the "hit rate" and the effect of the "veil of darkness," two often-cited methods for assessing fair policing. Our main report consists of three parts. First, we conduct an exporatory data analysis to get a big picture of policing in Austin. Second, we use various modelling strategies to assess the severisty of racial disparities. Third, we propose a measure of fairness based on the differences in the posterior median hit rate among individual police officers.

# Available Data

The primary data set is from the Stanford Open Policing Project[1] (from here on referred to as the Stanford data). This data set record stops made by the APD a roughly ten year period (2006.01.01 - 2016.06.30) and contains information such as the date of the stops, the subject's race, whether the person was searched or frisked, whether any contraband were found. Notably, this data lacks information about the time or place of the stops. Because the 2016 data is incomplete, we focus on the data for which we have complete years (2006-2015) for the first two prats of the analysis; this contains 463,944 stops.

Our secondary data set is from the 2019 Racial Profiling report, available from Austin Open Data (and hereafter referred to as the RP data). This data set contains similar information as the Stanford data, with additional information about the event time, location, and officer race. Notably, the race of the subject is missing from this data.

Lastly, we use US census demographic data. Specifically, we use

# Exploratory Analysis

We first examine the count of stops by race during 2006-2015 (Table 3), using the Stanford Data. It is notable that over half of the stops involved were of white subjects, about four times the number of stops of Black people. According to 5-year census data, the white population in Austin (445,269) is almost 7 times than the black population (66,724) — a classic Simpson's paradox. Examining figure 2, we can see that at least for Black, Hispanic and white drivers, the annual trends are very different by race.

| Driver Race | Counts | Proportion |
|---|---|---|
| asian/pacific | 11658 | 0.033 |
| black | 52381 | 0.147 |
| hispanic | 765707 | 0.215 |
| other | 2105 | 0.006 |
| unknown | 2622 | 0.007 |
| white | 211588 | 0.593 |

Table 3: Proportion of stops by race during 2006-2015

# Modeling

## Logistic Regression

### Logistic Regression for Frisk Rate

Our descriptive analysis shows that black people in Austin seem to be more likely to be stopped by the police. We want to answer the question, given a person is stopped, what factors may impact the likelihood of that person being frisked? To investigate this, we fit a logistic regression model with `frisk` as the dependent variable and `race`, `age`, and `sex`.

$$\text{Logit}[\text{P}(\text{Being Frisked})] = \beta_0 + \beta_1 \text{Race} + \beta_2 \text{Age} + \beta_3 \text{Sex}$$

Results can be found below.

### Logistic Regression for Contraband found

We want to investigate how likely contraband items are found when searching is performed. This is equivalent to calculating hit rate defined in section 2.2.2. We argue that if racial bias does not exist, the hit rate should be equal for all races. In other words, we expect

# Conclusion

In this study, we evaluate the fairness of traffic stops during the past two decades through three tests, namely benchmark test, outcome test and veil of darkness test. We found that the racial disparity in policing exists and is present in different scales spatially and temporarily. We also explore the causal confounding issues through logistic regression, finding that black and Hispanic people are more likely to be frisked and found with contraband items that are neither drugs or weapons.

Through the investigation of the hit rate via Bayesian hierarchical modeling, we obtained posteriors for the hit rate for each officer in a subset of the data. Using the medians for these posteriors, we devised a "fairness score," a tool we believe could be used to identify officers with racially disparate patterns of traffic stops.

# References


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